



# Sand Dune and Shingle Network

20th Newsletter, January 2015  
*Linking science and management*



Liverpool Hope  
University  
EST. 1844



## Introduction



### Paul Rooney

#### Director – Sand Dune and Shingle Network

Welcome to the January 2015 edition of the Sand Dune and Shingle Network newsletter. There has been a little gap since our last newsletter published in June 2014. This is because of the summer vacation and so much going on in terms of conferences and events in the autumn. As reported in the June newsletter, the two major sand dune events for Europe in 2014 were the EUCC-France event held in Merlimont, France (June 2014) and the Littoral 2014 conference (September 2014) in Klaipeda, Lithuania. We are awaiting the publication of the formal proceedings from the Merlimont event, and will keep you in touch with progress. For now a report summarising the French event, and the presentations delivered there, are available to download at <https://euccmerlimonten.wordpress.com/>

The Littoral 2014 conference was well attended, and gave the chance to visit the Curonian Spit. This was an outstanding sand dune experience, and one that I will remember all of my life. My thanks go especially to Dr. Ramunas Povilanskas from Klaipeda University and the EUCC-Baltic States.

With Dr. Maike Isermann of Bremen University, we convened a dune workshop at Littoral 2014 to review the current activity and identify future needs for dune networking in Europe. A report of the Littoral 2014 workshop is prepared and will be circulated to you together with the latest edition of our 'European Dune network' newsletter. Keep an eye on your e-mail in-boxes over the next few weeks for these publications.

The French and Lithuanian events were both very well organised, and thanks go to all those who worked so hard to make them happen. The events provided timely opportunities to take forward discussions and make decisions on the future of the Coastal and Marine Union – EUCC. As coastal dunes are such important parts of our European coast, it was heartening to see such a strong representation for coastal dunes at both events. You can be assured that coastal dunes are very well represented in the new structure of the EUCC.

As usual we welcome any proposals for field-based site visits or workshops. The successful model for these events is that they are mainly field based with a priority given to participant discussions and the exchange of knowledge that serves to 'link science and management'. Please get in touch on [dunes@hope.ac.uk](mailto:dunes@hope.ac.uk) with ideas and offers.

I wish to thank Tom Marshall for all his hard work supporting the Network over 2014, and wish him luck for the future as he moves on to new areas. Finally, I wish to welcome Emily De Noia as the new Network Assistant. Emily is appointed as a graduate intern from Liverpool Hope University.

## Network News



### Tom Marshall

#### Network Assistant Until December 2014

Hello and welcome to Issue 20 of the Sand Dune and Shingle newsletter. We hope you have all had a good summer and been out enjoying the shores, beaches and dunes responsibly. Maybe you took our newsletter onto the beach? If so we would like to hear your feedback. Please contact us at [dunes@hope.ac.uk](mailto:dunes@hope.ac.uk) with comments.

This is my third issue and I would like to show my thanks at being able to carry on my work and contribution here at the network. I hope you enjoy this issue. During my time here I have been collecting information related to the 2013-2014 winter storms. Over the course of the year, a key word search of media coverage has followed stories, issues and responses to the impacts of the storms. So hopefully I should have something coming up about this for you in the near future. If you have any comments to add or suggestions please get in touch through the address here - [dunes@hope.ac.uk](mailto:dunes@hope.ac.uk)

The storms, although changing the profile of the coast in many areas, have stimulated a number of research and monitoring studies to record the responses of coastal systems. We are pleased to publish the study by Professor Gerd Masselink on the impact of sequence of extreme storms during 2013/14 winter on Start Bay Gravel Barriers, South Devon. We hope to follow and publish the results of more studies in future issues.

If you are reading this and are not a member, please follow this link [coast.hope.ac.uk/joinnetwork](http://coast.hope.ac.uk/joinnetwork) and fill out an application form and send to us. We would also request if you have an article for us to get in touch. Alternatively, if you wish to know more simply follow this link to visit our homepage [coast.hope.ac.uk](http://coast.hope.ac.uk) .



### Emily De Noia

#### Network Assistant From January 2015

Hello everyone and welcome to Issue 20 of the newsletter. My name is Emily De Noia and I will be joining the Sand Dune and Shingle Network for a three month graduate internship. My internship role at the network is 'Network Assistant', which is very exciting; I'm looking forward to being part of the network and having the chance to meet everyone involved. I am a 2014 Geography BSc graduate from Liverpool Hope University, with a passion for environmental issues and the natural world. Through this internship, I look forward to extending my knowledge and understanding what it is to be part of a non-governmental organisation.

# Survey and analysis of vegetation and hydrological change in English dune slack habitats

Rachael Mills, Natural England

Sand dune slacks ('dune wetlands') are a rare and threatened habitat in England of European significance. The management of dune slacks in England is currently informed by evidence that was gathered in the late 1980s by the Sand Dune Survey of Great Britain<sup>1</sup>. The lack of recent data and understanding of the role of dune hydrology on slack vegetation communities and the potential impact of sea level rise and climate change has been identified, by the thematic hydrology sub-group of the Sand Dune and Shingle Network, as an area where further research is necessary. Natural England is required to use the best available evidence and scientific understanding of the biological, hydrological and physical processes to inform its decision making. The evidence gathered as part of this recent work will inform the advice Natural England gives on the management and restoration on this habitat, in addition to reporting on the condition and status of this feature.



Dune slack at Braunton Burrows, August 2012.  
©Centre for Ecology and Hydrology.

This research was conducted under a Memorandum of Agreement between Natural England and the Centre for Ecology and Hydrology and British Geological Survey, initiating a programme of linked vegetation and hydrological studies. The aim of the work was to gain a greater understanding of dune ecohydrological functioning and how this influences/controls the dune wetland vegetation; that can be applied to improve the management, condition and conservation status of sand dune slacks.

The report NECR153 - Survey and analysis of vegetation and hydrological change in English dune slack habitats is part of a suite of reports on wetland habitats; which includes, the generic guidelines for the key vegetation communities of dune slacks developed by Environment Agency, Natural England and Countryside Council for Wales *Ecohydrological guidelines for wet dune habitats, phase 2* (EA 2010), which built on an earlier publication *Development of eco-hydrological guidelines for dune habitats – phase 1* [R696] (NE 2006). Both documents

highlight the main principles to take account of in condition assessment, impact assessment and restoration projects and help to conceptualise how dune wetlands work; and recommendations for further studies to refine these guidelines and improve their operational application at the site level.

The recent project undertook, in 2012, a vegetation survey and a hydrological investigation of nine sites which hold over 70% of the English wetland resource.

## **Key outputs for all or a selection of sites**

- An up-to-date full inventory and description of dune wetland vegetation in England
- Information on soil conditions linked to vegetation data
- Improved understanding of soils and geological conditions underpinning dune sites
- Enhanced long term water table monitoring
- Fine detail water table monitoring of key dune slacks (annual cycle)
- Ground terrain models of key dune slacks
- Quantification of scrub evaporation
- Development of 'conceptual models' of the hydrological functioning of key dune sites.

## **Key findings of the vegetation survey and hydrological investigations**

- Analysis of change in mapped area showed a net loss of dune slack habitat at all sites except one.
- In many cases there was a shift from wet slack to dry slack types and from dry slack types to drier non-wetland habitats.
- Conceptual hydrological models produced for each site identified the important drivers and pressures at each.

The analysis of the data captured provides an insight into the extent, quality and hydrological processes of dune slacks in England. This will be used to refine conceptual hydrological models and provide data to aid understand of the potential impacts of climate change on these water-dependent habitats.

The findings will be used to inform further research, assess and report on the condition and status of this habitat and to provide management and restoration advice to site managers and others.

<sup>1</sup>Radley, G.P. 1994. *Sand Dune Survey of Great Britain: A national inventory. Part 1: England.* JNCC

# A volunteer survey of *Parnassia palustris* (Grass-of-Parnassus) on the Sefton Coast sand-dunes, Merseyside, north west England

Philip H. Smith, philsmith1941@tiscali.co.uk

Ben Deed, ben.deed@merseysidebiobank.org.uk

Occurring as the coastal form var. *condensata*, *Parnassia palustris* (Grass-of-Parnassus) is one of the most iconic dune-slack plants of the Sefton Coast and has been a well known feature since Victorian times. Thus, McNicholl (1883) wrote:

"There are localities among the sandhills beyond Birkdale where, in favourable seasons, so vast is the quantity of the Parnassia that the whiteness of the ground may be compared to that given by daisies to the sward."



*Parnassia palustris* New Green Beach 20 8 12

*P. palustris* has a mostly northern distribution in Britain and has disappeared from many English localities. It is listed by the County Wildlife Trust as "endangered" in Lancashire, Greater Manchester and north Merseyside, having drastically declined or become extinct at most inland localities in recent decades. Although the species was known to be widespread and often common on the Sefton Coast (Smith, 2009), no detailed information on its distribution, abundance or habitats was available to plan its conservation. It was therefore decided to organise a survey to cover all dune slacks thought suitable for the plant.

Having attended training events, 35 volunteers organised into teams were allocated search areas, within which they recorded the number of flowering *P. palustris* plants, area occupied, national grid reference for each colony and a range of standard habitat variables. In addition, experienced botanists recorded quadrats in representative habitat using UK National Vegetation Classification (NVC) methodology and took soil samples for pH determination.

Over 46,000 plants were counted within about 5ha of habitat, despite a record high water-table, which was thought to have reduced many populations. The target

species was found in a small proportion of the available dune slack habitat, the largest colonies being in more westerly (i.e. younger) dune slacks with a relatively high soil pH of 6.9-7.8 and low sward heights of 10 to 35cm. Both wet and dry slacks were occupied but plants in wet-slacks were generally found around the drier fringes, especially where Rabbit *Oryctolagus cuniculus* grazing or human trampling maintained shorter swards. *P. palustris* was usually absent from older slacks, these often supporting tall stands of *Salix repens* (Creeping Willow) and other shrub species. NVC communities containing the target species included SD13: *Sagina nodosa-Bryum pseudotriquetrum* dune slack and SD14: *Salix repens-Campylium stellatum* dune slack, these being associated with younger slacks, while SD16: *Salix repens-Holcus lanatus* dune-slack was found in older sites. It proved possible to link recent changes in population sizes to habitat characteristics and also relate these to historical descriptions of the plant's occurrence in the 19th and early 20th centuries (Smith & Deed, 2014).

The Sefton Coast probably supports nationally significant numbers of *P. palustris*, its conservation depending on management that maintains open, nutrient-poor, relatively scrub-free slack communities that are close enough together to allow successful seed dispersion. Because the dune system is becoming more stable, few new slacks are being produced and it may be necessary to consider mechanical rejuvenation as a means of creating suitable habitat in the future and to mitigate the likely drying effects of climate change.

## Acknowledgements

We are extremely grateful to the volunteers whose unstinting efforts made this survey possible. Our thanks are also due to coastal landowners who gave permission for access, Natural England for permits and other documentation and Sefton Council's Coast & Countryside Service who provided facilities for training exercises. Catherine Highfield and Richard Burkmar kindly assisted with statistical analyses.

## References

McNicholl, E. D. (ed.) (1883). *Handbook for Southport*. Robert Johnson & Co., Southport.

Smith, P.H. (2009). *The sands of time revisited. An introduction to the sand-dunes of the Sefton Coast*. Amberley publishing, Stroud, Gloucestershire.

Smith, P.H. & Deed, B. (2014). A volunteer survey of *Parnassia palustris* (Grass-of-Parnassus) on the Sefton Coast, Merseyside, v.c. 59. *BSBI News* 127: 5 -18

Prof. Gerd Masselink

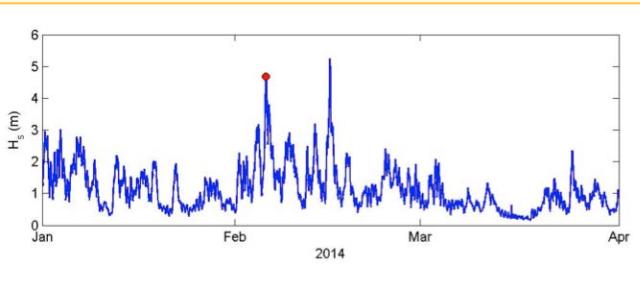
Coastal Processes Research Group, School of Marine Science and Engineering, Plymouth University

## Introduction

The southwest coast of England experienced an unprecedented sequence of very energetic wave conditions in the winter of 2013/2014. ([http://www.metoffice.gov.uk/media/pdf/n/i/Recent\\_Storms\\_Briefing\\_Final\\_07023.pdf](http://www.metoffice.gov.uk/media/pdf/n/i/Recent_Storms_Briefing_Final_07023.pdf)). According to the Met Office, the storm Hercules on 5/6 January 2014 was a 1:5 to 1:10 year wave event alone, while the storm Petra on 4/5 February 2014 was probably the most damaging storm in terms of coastal impact on the south coast of Devon and Cornwall. Furthermore, preliminary analysis of a combined time series of modelled and measured wave data by Plymouth University shows that the 8 week sequence of storms from mid-December 2013 to mid-February 2014 represents the most energetic period of waves to have hit the south west coast of England since 1950, and thus represents at least a 1:60 year event. The storms that occurred during the 2013/2014 winter season were Atlantic storms, meaning that they were incident from the west to south west; this has an important bearing on the impacts. This brief report will focus on the morphological impact of the storm Petra on the gravel barriers of Start Bay in south Devon, in particular on the largest of the barriers: Slapton Sands.

## Wave conditions

Figure 1 shows the wave conditions recorded by the directional wave buoy deployed in Start Bay over the period January to March 2014 and highlights the energetic nature of the wave forcing over this period, especially during February. A peak significant wave height of  $H_s = 4.7$  m was recorded around midnight of 4/5 February and this coincided with a high water level of 3.0 m CD at Devonport (no tide measurements are available from Start Bay). The recorded water level at Devonport was c. 0.8 m higher than predicted, representing a very significant storm surge. Interestingly, a larger peak significant wave height of  $H_s = 5.3$  m was attained during the storm on 14/15 February, but the storm peak coincided with low tide and was of very short duration; no significant damage due to this event has been reported.



**Figure 1** – Time series of half-hourly significant wave height  $H_s$  recorded by the directional wave buoy deployed in Start Bay over the period January to March 2014. The peak of the storm Petra on 4/5 February is indicated with the red circle. Data were obtained from the Channel Coastal Observatory (<http://www.channelcoast.org/>).

## Gravel barriers of Start Bay

There are 4 beaches situated in Start Bay, South Devon, and from south to north these are: Hallsands, Beesands, Slapton Sands and Blackpool Sands. The beaches are all composed of fine shingle, generally decreasing in median size towards the north from 5–10 mm to 2–4 mm, and the orientation of the beaches grades from S–N in the southern part of the bay (Hallsands) to SW–NE in the north (Blackpool Sands). The beaches vary greatly in size: Hallsands and Blackpool Sands are 100–200 m long, Beesands is c. 1 km long, and Slapton Sands is 4–5 km long. A small back barrier marsh area can be found behind the gravel barriers of Hallsands and Blackpool Sands, whereas a freshwater lagoon is present behind the Beesands and Slapton Sands. On all Start Bay beaches, except Blackpool Sands, coastal protection structures are present. A small rip-rap structure is located at the southern end of Hallsands to protect property, access road and car park. A large seawall fronted by rip-rap is present at the southern end of Beesands to protect the village, with the rip-rap continuing over most of the middle section of the beach. On the southern end of Slapton Sands a seawall protects the village of Torcross and some concrete blocks protect the car park in the middle section.

## Qualitative storm impacts

A visual summary of the storm impacts of the beaches of Start Bay is presented in Figure 2. Due to the westerly and southwesterly direction of the storm waves, there was a distinct spatial variability in the coastal response on the different beaches. Specifically, the southern sections of the beaches experienced much more erosion than the northern section.



**Figure 2** – Southward (upper panels) and northward (lower panels) views of Hallsands (left panels), Beesands (middle panels) and Slapton Sands (right panels). Most damage on these beaches was done during the Petra storm on 05/02/14. On Hallsands, the storm undermined the rip-rap protecting the road, ultimately causing the collapse of both (upper-left panel). A large amount of gravel was removed from the beach, exposing a peat surface c. 5,000 years old (lower-left panel). At Beesands, the rip-rap and seawall at the southern end of the beach

held, but all gravel was removed from the beach with the rip-rap extending to the low-tide level (upper-middle panel). Along the middle section of Beesands, just north of the end of the seawall, the rip-rap was overwashed and gravel was removed from behind and underneath the rip-rap. The shoreline behind the rip-rap was eroded by c. 10 m and the rip-rap structure itself dropped in elevation by several metres (lower-middle panel). The seawall at the southern end of Slapton Sands also held, but here also most of the beach gravel was removed (upper-right panel). The middle section of Slapton Sands was severely overwashed, resulting in up to 15 m erosion and deposition of a 0.3-m thick overwash deposit on the road running along the crest of the barrier. All photos except the one of the gravel on the road (<http://www.bbc.co.uk/news/uk-26064424>) were taken on 28 April 2014 with repair work ongoing.

### Beach monitoring results for Slapton Sands

Slapton Sands has been monitored monthly since 2005 with cross-shore transects every 250–500 m. In addition, an ARGUS video monitoring station is installed on a cliff at the northern end of Slapton Sands and has been recording data since 2005. The beach morphological change over the winter storm period along Slapton Sands for transects P0 (south), P11 (middle) and P19 (north) are presented in Figure 3, and can be summarised as follows. (1) At the southern end of Slapton Sands, at transect P0 and where a seawall protects the village of Torcross, lowering of the beach by up to 4 m occurred. There is no actual retreat at this location, because the seawall has 'held the line'. (2) Over most of the middle section of the Slapton Sands barrier significant lowering of the beach by c. 2 m and retreat of the barrier crest of up to 15 m occurred. Most coastal retreat occurred around the middle car park section, just south of transect P11. (3) At the northern end of Slapton Sands some lowering of the beach and retreat of the barrier crest occurred, but overtopping and overwashing during the peak of the storm also resulted in deposition at the back of the barrier, including onto road. Most deposition occurred at the far northern end of the barrier, at transect P19, where the morphological response was characterised by vertical accretion and shoreline progradation: the overwash deposit at the back of the beach is c. 1 m thick and the shoreline prograded by more than 20 m.

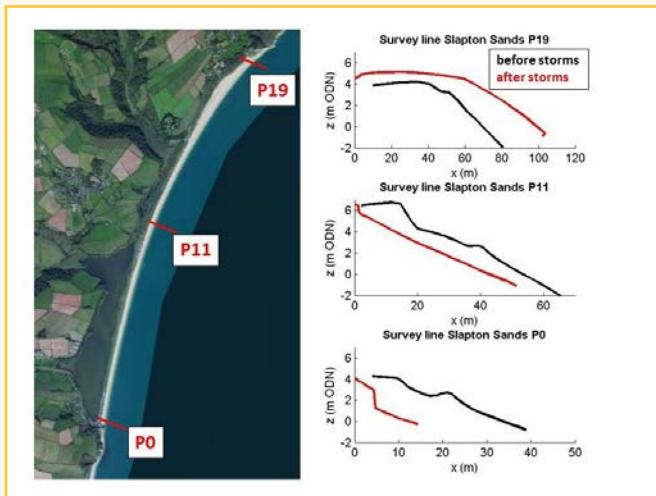


Figure 3 – Aerial photograph of Slapton Sands barrier system (<http://www.bing.com/maps/>) with position of

survey transects P0, P11 and P19, and morphological response at the transects over the 2013/2014 winter season.

### Synthesis

Extreme storm response is usually associated solely with coastal retreat, erosion and flooding. The response of the gravel barriers in Start Bay show some elements of this, but also demonstrate accretionary responses, mainly at the northern end of the beaches, especially on Slapton Sands. Such alongshore-varying response strongly suggests longshore sediment transport processes need to be invoked to explain the observed storm responses. Figure 4 shows an ARGUS snapshot of the northern end of Slapton Sands taken at 11:00 on 5 February. Note that this is just after the peak of the storm Petra which coincided with the midnight high tide on 4/5 February. The conditions represented by Figure 4 are still highly energetic ( $H_s$  = c. 3.2 m) and with elevated water level (high tide level = 2.9 m ODN), but less energetic than during the peak of the storm when  $H_s$  was 4.7 m. What is most remarkable about the picture is the extremely large incident wave angle, estimated at c. 45°. Such large wave angles and energetic waves generate large longshore sediment transport and explains why the northern end of Slapton Sands accreted, whilst the southern end eroded. The significance of the storm wave angle for the morphological response on Slapton Sands has previously been demonstrated by Ruiz de Alegria-Arzaburu and Masselink (2010), and emphasises the importance of considering the direction of the storm waves, as well as the storm wave height and period, when investigating coastal response to storm activity.



Figure 4 – ARGUS snapshot image of the northern end of Slapton Sands taken at 11:00 on 5 February showing the large incident wave angle and overtopping of the barrier crest. Note that the picture does not represent the peak of the storm, which occurred during the night tide on 4/5 February.

### References

Ruiz de Alegria-Arzaburu, A. and Masselink, G., 2010. Storm response and seasonal morphological change on a gravel beach, Slapton Sands, UK. *Marine Geology*, **278**, 77–99.

# Re-mobilisation of dunes at Newborough Warren, Wales - monitoring the re-colonisation by pioneer slack beetles.

Dick Loxton

As was reported in Newsletter 17, Natural Resources Wales had undertaken a major dune restoration at Newborough Warren and Ynys Llandwyn NNR in March 2013. The restoration took the form of skimming off the surface vegetation of the wetter part of the slacks and some of the surrounding dunes.

The two more northern excavated slacks were monitored by pitfall trapping in 2013 and the slack to the South East of these was used as a control. The details of this monitoring can be found in Loxton (2014) - an electronic copy can be obtained from

[Michael.Howe@naturalresourceswales.gov.uk](mailto:Michael.Howe@naturalresourceswales.gov.uk)

Previous surveys by the writer in 1963/4, 1980-83 and 2007-08 had indicated that since the 1980s species of beetle (this note will be limited to beetles) characteristic of dunes, had either apparently disappeared such as *Anthicus bimaculatus* or had retreated to the fore dunes behind the beach. These species had been common even further inland than the slacks studied here. These include some of the characteristic species of dunes with some bare sand such as the carabid *Broscus cephalotes*, the tenebrionid *Xanthomus pallidulus*, the scarab *Aegialia arenaria*, the histerid *Hypocaccus rugiceps* and the leiodid *Hydnobius punctatus*.



*Aerial photo of dunes in June 2013. The two excavated slacks monitored in 2013 are at the middle of the photograph with the slack used as a 'control' immediately to the west of them.'*

These two slacks are some way from the fore-dunes, about 700m, and we may have to wait before these species re-colonise the bare sand habitat exposed. However, a single specimen of *Hypocaccus rugiceps* was taken so we hope that future monitoring will detect a return of this fauna to our newly exposed bare sand. In an ideal scenario one would have liked to see a 'corridor' of bare sand from the fore-dunes to these inland slacks. But as the situation is at present it does allow us to see how mobile the fore-dune fauna is, and how soon it will re-colonise this inland open sand habitat.

In 2011 (Bratton, 2012) a survey of the dunes at Newborough Warren was undertaken to assess the status of pioneer slack habitat. This survey revealed that this habitat had been effectively lost at Newborough, though some of the specialist fauna was perhaps hanging on at the edges of the saltmarsh and the edges of shallow ponds dug to provide water for grazing ponies and cows. This habitat occurs, if rigorously defined, at the interface of slack and dune where the dune face is being eroded. The dune faces of the parabolic slacks have now become vegetated and little sand movement is occurring. Similarly the slacks have become ever more thickly vegetated to the edge of the dune. For the present writer the changes since, the 1960s have been dramatic. In the 1960s the slacks, though containing a variety of plants, had areas between the plants without vegetation but with a dark crust of mineral, organic material, fungi and the alga *Nostoc*. This surface habitat hardly occurs nowadays. Bratton (2012) listed 16 beetle species as target species for pioneer slack habitat and four of these were caught in 2013, *Dyschirius politus*, *Bembidion pallidipenne*, *Bledius subniger* and *Gabrius osseticus*.



*Bledius subnige*

I had never seen *B. pallidipenne* in these inland slacks though I was familiar with it out on the seaward edges of the salt marsh. The other three species had been found only rarely or not at all in recent surveys. Only small numbers were caught but this seemed encouraging as this specialised fauna seemed to be already finding the habitat provided by the restoration programme.

In 2014 monitoring has continued and so far we are delighted to find that a particular fauna of two *Bledius* species, *B. fergussoni* and *B. subniger*, have appeared in numbers in a very specific zone which is at the interface of dune and slack. They do not extend down into the wetter parts of the excavated slacks that were flooded in the winter, or above where the sand was still damp in June. The insects can be detected by the sand casts they throw up and can be found by excavation with a knife down to about 5mm. In addition pitfalls are catching large numbers of one of their predators, *Dyschirius politus*, which is a small, shiny, fossorial carabid. Also there are large numbers of *B. pallidipenne* being caught in pitfalls; this species is

not strongly adapted for digging and is presumably hunting on the surface. The abundance of these few specialised species, so rare or absent in the recent past, is very encouraging, and let us hope that future monitoring will detect further immigrants.

At present the wet surfaces of these excavated slacks have little vegetation and the sand that the *Bledius* beetles are living in appears to have a very low organic content – perhaps they are adapted to feed off a fine film of bacteria etc on the surface of the sand grains?

In time no doubt the surface of these slacks will contain more organic matter. At present the main sources of organic material seems to be coming from the pony dung, seagulls that congregate on the slacks leaving faeces and regurgitated pellets, filamentous green alga that flourishes in the flood water in the spring, possibly fertilised by the animals mentioned, and the dead leaves of plants blown across the slack into the winter floods, the leaves of *Salix repens* being the most obvious of these. When the organic material rises we will expect to find other species of the pioneer slack habitat such as several species of *Dryops* and *Heterocerus* and further staphylinids. Several of these were detected in small numbers in 2013 but have so far not been seen by finger searching in 2014. At a slightly later stage in the succession no doubt will come the dung beetle *Aphodius plagiatus* which, despite being a member

of a genus of dung feeding beetles, is limited in Britain to wet dune slacks and has become secondarily adapted to feed as an adult on fungi and as a larva on organic material in the soil (Loxton, 2014). In 2013 only a single example of this species was taken in the 'control' slack. In the 1960s a similar amount of trapping effort would have yielded hundreds of this beetle.

It is hoped to continue monitoring the fauna in these slacks and we are looking at other taxa, particularly spiders and aculeate Hymenoptera. Apart from the gulls mentioned above the only vertebrates that seem to be taking advantage of the change of habitat have been a family of Lapwing feeding in these slacks and recently a Pied Wagtail hunting flies on the damp bare sand.

### References

Bratton, J.H., (2012) Condition Assessment of the Invertebrate Fauna of Pioneer Dune Slacks at Newborough Warren – Ynys Llanddwyn SSSI in 2011. CCW Contract Science Report No. 1001. Countryside Council for Wales, Bangor.

Loxton, R.G., (1966) Notes on the biology of *Aphodius plagiatus* (L.) (COLEOPTERA: SCARABAEIDAE) *The Entomologist* **99**: 91-97.

Loxton, R.G., (2014) Monitoring invertebrates by pitfall trapping after excavation of the surface vegetation in two slacks at Newborough Warren – Ynys Llanddwyn SSSI in 2013. NRW Evidence Report No: 22, Natural Resources Wales, Bangor.

## New report finds Scottish shingle thriving



*Shingle habitat covered in Oyster plant*

A geographical survey by the Universities of Southampton and Cambridge for Scottish Natural Heritage (SNH) has found there are more vegetated shingle beaches in Scotland than previously thought – and the majority are in good condition.

Until recently information on shingle habitats in Scotland has been limited, but a new report compiled by GeoData, at the University of Southampton, with research colleagues at Cambridge, finds there are around 1,120 hectares of shingle beaches with vegetation in Scotland.

"For the first time we've created a national inventory of coastal vegetated shingle habitats in Scotland," says Gemma Gubbins of GeoData. "This inventory forms a comprehensive baseline for ongoing monitoring and research and is already allowing comparisons to be made with earlier surveys."

Vegetated shingle supports a variety of plants and animals,

with some highly specialised species adapted to tolerate harsh coastal conditions. Typical plants include the salt-tolerant oysterplant and sea kale, both of which are nationally scarce. A rich array of lichens can also be found on stable, undisturbed, shingle further inland.

Some species of invertebrates also favour shingle habitats, such as the black zipper spider, sand bear spiders and a number of rove beetles. The habitat is also of crucial importance for breeding terns, which has led to several conservation designations.

Shingle coastlines are a distinctive feature of the Solway and Moray Firths and the Isle of Arran, as well as on scattered sites around the coast of Scotland. Vegetated shingle is one of the UK's Priority Habitats and is protected under the EU Habitats Directive and about 20 shingle sites in Scotland are protected under national legislation.

Rebecca O'Hara, SNH habitats officer, said: "Coastal shingle is internationally rare and is an important and unique part of Scotland's nature. Powerful waves form these beaches, which host a fascinating variety of plants and animals in what may seem to be inhospitable conditions. Because of this, we were really pleased to find that shingle habitat is doing so well. Scotland's remote and relatively untouched coasts provide some of the best conditions in Europe for vegetated shingle."

"This new survey adds to our growing knowledge of habitats of European importance in Scotland, and will be part of a new habitat map which SNH is developing."

## Pirri-pirri Burr (*Acaena novae-zelandiae*) at Foveran Links, Aberdeenshire

In May 2012, Mike Smedley, an Operations Officer with Scottish Natural Heritage, noticed a Pirri-pirri Burr growing in the north of Foveran Links Site of Special Scientific Interest (SSSI), which lies on the Aberdeenshire coast about 20 km north of Aberdeen. David Welch of the Botanical Society of the British Isles subsequently confirmed the identification as New Zealand Pirri-pirri Burr *Acaena novae-zelandiae*. The presence of this species, which has infamously affected Lindisfarne and Northumbria, immediately caused concern. Foveran Links SSSI covers an area of over 200 ha of sand dune and lies immediately adjacent to the Sands of Forvie and the Ythan Estuary SSSI, Forvie National Nature Reserve (NNR), and the Sands of Forvie Special Area of Conservation (SAC), designated for dune habitats, with the fifth largest area of windblown sand in the UK.



*Foveran Dunes overlooking the Ythan Estuary where Pirri-pirri Burr occupies discrete patches amongst marram grass*

Having noted the plant in a few locations within an area of about 2 ha, SNH contacted the landowner and gained permission to attempt eradication of the plants using herbicide. The staff and volunteers at Forvie NNR were happy to assist, given its apparent limited extent in one area of the dunes and the threat of spread to the adjacent nature reserve.



*Common gorse *Ulex europaeus**

Our first task was to locate and record patches of the plant to determine the extent of its spread, which we did so over the 2 ha. Flower and seed heads were removed from plants by hand and double-bagged for later incineration in a lidded brazier, and the plants were then treated with glyphosate (2% Roundup), as recommended by Natural England, applied from a knapsack sprayer.

Subsequent visits to the site in 2012 and 2013 showed

the herbicide to be largely effective, with most sprayed patches showing very little regrowth. However, many more patches of the plant were discovered and continue to be found on every visit to the site, including this summer of 2014. The plant is now thought to be present in discrete patches across an area of around 7 ha but it is difficult to determine how much the plant might have spread in the last 2 years and how much was undetected until now. We feel that the approach we are taking will be effective, but also necessary for many years to come given the extremely efficient dispersal of the plant's burrs, attaching to visitors' clothing, dogs and rabbits.



*Pirri-pirri Burr growth*

The plant has been found most commonly along routes used by visitors and animals, but also in a variety of grassland habitats away from apparent routes and even growing up through dense gorse.

A programme of visitor awareness will now also be increased to assist in identifying the true extent of the plant in the north of Foveran Links SSSI as it could easily spread to Forvie. One plant was recorded close to the visitor centre of Forvie NNR in 2013 and was removed as soon as it was discovered.

Any advice or comments on control of *Acaena* species are welcomed to myself at Forvie or Mike Smedley in Aberdeen.

[Annabel.Drysdale@snh.gov.uk](mailto:Annabel.Drysdale@snh.gov.uk) | [Mike.Smedley@snh.gov.uk](mailto:Mike.Smedley@snh.gov.uk)

**Editors Note:** We note that there is no guidance on treatment on the website of the GB non-native species secretariat <http://www.nonnativeSpecies.org/index.cfm?pageid=542> and the site so far only includes a report from Lindisfarne NNR so any relevant experience would be most welcome.

We encourage you to post comments and management experience on our LinkedIn page see past examples

[https://www.linkedin.com/groups/Information-appeal-on-invasive-qualities-7484455?home=&gid=7484455&trk=my\\_groups-tile-grp](https://www.linkedin.com/groups/Information-appeal-on-invasive-qualities-7484455?home=&gid=7484455&trk=my_groups-tile-grp)

[https://www.linkedin.com/groups/Rosebay-Willowherb-information-request-6609856?home=&gid=6609856&trk=my\\_groups-tile-grp](https://www.linkedin.com/groups/Rosebay-Willowherb-information-request-6609856?home=&gid=6609856&trk=my_groups-tile-grp)

[https://www.linkedin.com/groups/SDSN-request-Information-manage-behaviour-6708821?home=&gid=6708821&trk=my\\_groups-tile-grp](https://www.linkedin.com/groups/SDSN-request-Information-manage-behaviour-6708821?home=&gid=6708821&trk=my_groups-tile-grp)

# Slippery, Scaly and Sandy: surveying herpetofaunal diversity in an Irish coastal habitat

Rob Gandola, Robert O' Sullivan, Collie Ennis, Megan Doyle and John Paul Dunbar



North Bull Island (Figure 1), a 5km long, 800m wide island located in Dublin Bay on the east coast of Ireland, is a recognised area of international importance with UNESCO Biosphere Reserve and Ramsar Site among other European and national designations. The island has both public (1,318 ha) and private ownership (118 ha), with the majority being a public park managed by Dublin City Council (DCC).

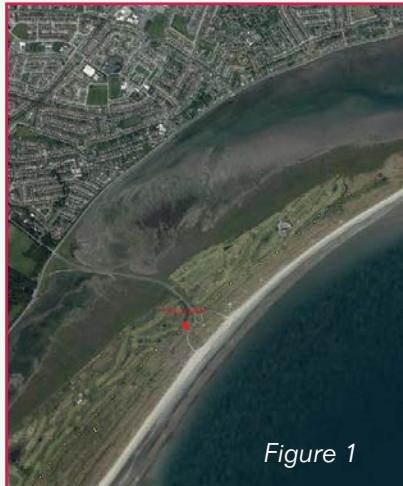


Figure 1

North Bull Island comprises extensive areas of fixed coastal dunes with herbaceous vegetation, humid dune slacks and man-made amenity grasslands with a number of natural, ephemeral and artificial, permanent water bodies (McCorry and Ryle, 2009). This diverse landscape potentially

offers an ideal mosaic of habitats for three species of native Irish herpetofauna; the common frog *Rana temporaria*, the smooth newt *Lissotriton vulgaris* and the common lizard *Zootoca vivipara* (Inns, 2009). Both the common frog and common lizard are assumed to occur on the island based on anecdotal reports, having colonised via a causeway constructed in the early 1960s. However since all native reptile and amphibian species are protected by law under the Wildlife (and Amendments) Acts 1976-2012, a thorough evaluation of the status and distribution of these insular populations was deemed imperative by DCC in its Management Plan of 2009 (see McCorry and Ryle, 2009).

In November 2013, The Herpetological Society of Ireland was invited by DCC to conduct a herpetological survey of North Bull Island with the intention that the findings of the survey will directly contribute to the new Biodiversity Action Plan and the future habitat management of the island. With a team of volunteer surveyors, the survey began in early February 2014, to coincide with the onset of the breeding season of the common frog. Nocturnal and diurnal surveys of water bodies, the surrounding terrestrial dune habitat and refugia were conducted with any individuals, spawn and tadpoles encountered being recorded. Similarly, the search for smooth newts was conducted using a combination of visual inspections of water bodies coupled with submersible net traps and inspection of the surrounding dune system.

In late March, the focus shifted towards the vegetated coastal dune system and the amenity grasslands to search for presence of the common lizard. Searches were

conducted along existing pathways, and both natural and artificial refugia were searched. In addition to searching resident refugia, artificial cover objects (ACOs) were spread across approximately 3km of the coastal dune – amenity grassland border (Fig. 1). These ACOs provided excellent cover and basking sites for lizards, and aided surveying via the provision of easily identifiable and replicable survey sites.



The presence of a healthy population of the common frog and a small population of the common lizard on the island has been confirmed. DCC has taken these preliminary findings under consideration and aim use the recommendations to protect these populations, in particular, by limiting further changes to the habitats around the coastal dune – amenity grassland border and humid dune habitat. These aims will potentially be achieved via new additions to the habitat management regime.

As with previous studies, citizen science continues to play a vital role in the success of the HSI's scientific undertakings. With this in mind, The Herpetological Society of Ireland would like to encourage readers to contact us if they wish to participate in any future studies.

The HSI would like to thank Dublin City Council, National Parks and Wildlife Service, and above all, our volunteers. For free membership and to keep up to speed with our projects, check in with us at [www.thehsi.org](http://www.thehsi.org) or find us on Facebook.

**Rob Gandola**  
[rgandola@thehsi.org](mailto:rgandola@thehsi.org)

## References:

Inns, H. (2009) *Britain's reptiles and amphibians*. WildGuides, Old Basing, UK.

McCorry, M. and Ryle, T. (2009) *North Bull Island Management Plan*. Dublin City Council.

## Acknowledgement:

Some of the photographs and text have been reproduced with permission from an earlier version of the article in FrogLog111, the newsletter of the IUCN Amphibian Specialist group. See <http://www.amphibians.org/froglog/f111>

# Recent Publications

## Management & Monitoring

Bouma T. J., Belzen J., Balke T., Zhu Zhenchang., Airoldi L., Blight A. J., Davies A. J., Galvan C., Hawkins S. J., Hoggart S. P. G., Lara J. L., Losada I. J., Maza M., Ondiviela B., Skov M. W., Strain E. M., Thompson R. C., Yang S., Zanuttigh B., Zhang L., & Herman P. M. J. (2014) Identifying knowledge gaps hampering application of intertidal habitats in coastal protection: opportunities & steps to take. *Coastal Engineering* **87**, (1) 147-157

Buijs A., Muttijssen T. and Arts B. (2014) "The man, the administration and the counter-discourse": an analysis of the sudden turn in Dutch nature conservation policy. *Land Use Policy* **38**, 676-684

Chadenas C., Creach A. and Mercier D. (2014) The impact of storm Xynthia in 2010 on coastal flood prevention policy in France. *Journal of Coastal Conservation* **18**, 529 - 538

Jonsson E. (2014) Contested expectations: Trump International Golf Links Scotland, polarised visions, and the making of the Menie Estate landscape as resource. *Geoforum* **52**, (1) 226-235

Kelly J. F. (2014) Effects of human activities (raking, scraping, off-road vehicles) and natural resource protections on the spatial distribution of beach vegetation and related shoreline features in New Jersey. *Journal of Coastal Conservation* **18**, 383-398

Lucrezi S., Saayman M. & van der Merwe P. (2014) Influence of infrastructure development on the vegetation community structure of coastal dunes: Jeffreys Bay, South Africa. *Journal of Coastal Conservation* **18**, 193-211

Van der Meulen F., Van der Valk B., Baars L., Schoor E., and Van Woerden H. (2014) Development of new dunes in the Dutch Delta: nature compensation and 'building with nature'. *Journal of Coastal Conservation* **18**, 505-513

Musereau J. & Regenauld H. (2014) Storms impact on morphodynamics of human controlled coastal features in western France: the prevailing role of local management practices. *Journal of Coastal Conservation* **18**, 539-55

Nield J. M., Kink J., and Jacons B. (2014) Detecting the surface moisture in aeolian environments using terrestrial laser scanning. *Aeolian Research* **12**, (1) 9-17

## Flora/ Fauna

Bessa F., Concalves S. C., Franco J. N., Andre J. N., Cunha P. P. & Marques J. C. (2014) Temporal changes in macro fauna as response indicator to potential human pressures on sandy beaches. *Ecological Indicators* **41**, (2) 49-57

Bunbjer A. K., Cavender-Bares J., Eiserhardt W. L., Ejrnaes R., Aarssen L. W., Buckley H. L., Forey E., Jansen F., Kattge J., Lane C., Lubke R. A., Moles A. T., Monserrat A. L., Peet R. K., Roncal J., Wooton L. & Svenning J. C. (2014) Multi-scale phylogenetic structure in coastal dune plant communities across the globe. *Journal of plant Ecology* **7**, (2), 101-114

Esquivias M. P., Zunzunwgui M., Barradas M. C. D., and Alvarez-Cansino L. (2014) The role of water use and uptake on two Mediterranean shrubs' interaction in a brackish coastal dune ecosystem. *Ecohydrology* **7**, (2), 783-793

Jamilah M. S., Nur-Faiezah A. G., Siti Kehirah A., Siti Mariam M. N., & Razakli M. S., (2014) Woody plants on dune

landscape of Terengganu, Peninsular Malaysia. *Journal of tropical forest Science* **6**, (2) 267-271

Marcantonio M., Rocchini D., & Ottaviani G. (2014) Impact of alien species on dune systems: a multifaceted approach. *Biodiversity and conservation*, **23**(11) 2645- 2668

Pina M. S., Canadas E. M., & Bacchetta, G. (2014) Initial constraints in seedling dynamics of *Juniperus macrocarpa* Sm. *Plant Ecology*, **215**(8), 853-861

Selami N., Auriac M. C., Catrice O., Capela D., Kaid-Harache M. & Timmers T. (2014) Morphology and anatomy of root nodules of *Retama monosperma* (L.)Boiss. *Plant and Soil*. **379**, (1-2):109-119

Timm B. C., McGarical K., and Cook R. P. (2014) Upland Movement Patterns and Habitat Selection of Adult Eastern Spadefoots (*Scaphiopus holbrookii*) at Cape Cod National Seashore. *Journal of Herpetology*, **48**(1) 84-97

Mateille T., Tavoillot J., and Fargette M. (2014) Importance of soil characteristics for plant-parasitic nematode communities in European coastal foredunes. *European Journal of Soil Biology*. **64** 53- 60

Menkis A., Ihrmark K., Stenjed J. & Vasaitis R. (2014) Root-Associated Fungi of *Rosa rugosa* Grown on the Frontal Dunes of the Baltic Sea Coast in Lithuania. *Microbial Ecology*. **67**, (4) 769-774

Psuty N. P., Spahn A., Silveria T. M. and Schmetz W. (2014) Sediment budget as a driver for sediment management at plumb beach, New York, USA: vectors of change and impacts. *Journal of Coastal Conservation* **18**, 515 - 528

## Modelling

Allen D., Darling W. G., Williams P. J., Stratford C. J. & Robins N. S. (2014) Understanding the hydrochemical evolution of a coastal dune system in SW England using a multiple tracer technique. *Applied Geochemistry*. **45**, 94-104

Dobrotin N., Bitinas A., Michelevicius D., Damusyte A., & Mazeika J. (2013) Reconstruction of the Dead (Grey) Dune evolution along the Curonian Spit, Southeastern Baltic. *Bulletin of the geographical society of Finland*. **83** ,53-64

Geml J., Gravendeel B., van der Gaag K.J., Neilen M., Lammers Y., Raes N., Semenova T.A., de Knijff P. & Noordeloos M.E. (2014) The Contribution of DNA Metabarcoding to Fungal Conservation: Diversity Assessment, Habitat Partitioning and Mapping Red-Listed Fungi in Protected Coastal *Salix repens* Communities in the Netherlands. *PLoS ONE* **9**(6) 1-17

Gontz A. M., Moss P. T. & Wagenknecht E. K. (2014) Stratigraphic Architecture of a regressive strand plain, Flinders Beach North Strandbroke Island, Queensland, Australia. *Journal of Coastal Research*. **30**, (3) 575-585

Li F., Van Gelder P. H.A. J. M., Vrijling J. K., Callaghan D. P., Jongejan R. B., and Ranasinghe R. (2014) Probabilistic estimation of coastal dune erosion and recession by statistical simulation of storm events. *Applied Ocean Research*. **47** 53-62

Plant N. G., Flocks J., Stockdon H. F., Long J. W., Guy K., Thompson D. M., Cormier J. M., Smith C. G., Miselis J. L. and Daylander P. S. (2014) Predictions of barrier island berm evolution in a time-varying storm climatology. *Journal of Geophysical Research Earth Surface*. **119**, (2) 300-316

## Engineering

Firth L. B., Thompson, R. C., Abbiati M., Airoldi L., Bouma T.J., Bozzeda F., Cecchereli V. U., Colangelo M. A., Evans A., Ferrario F., Hanley M. E., Hlnz H., Hoggart S. P. G., Jackson J. E., Moore P., Morgan E. H., Perkol-Finkel S., Skov M.W., Strain E. M., Belzen I., Hawkins S. J. (2014) Between a rock and a hard place: Environmental and engineering considerations when designing coastal defence structures. *Coastal engineering* **87**, (1) 122-135

Hanley M. E., Hoggart S. P. G., Simmonds D. J., Bichot A., Colangelo M. A., Bozzeda F., Heurtefeux H., Ondiviela B., Ostrowski R., Recio M., Trude R., Zawadska-Kahlau E. & Thompson R. C. (2014) Shifting sands? Coastal protection by sand banks, beaches and dunes. *Coastal engineering* **87**, (1) 136-146

Sedratti M. & Anthony E.J. (2014) Confronting coastal morphodynamics with counter-erosion engineering: the

emblematic case of Wissant Bay, Dover Strait. *Journal of Coastal Conservation* **18**, 483 -494

Tresca A., Ruz M-H. & Gregoire P. (2014) Coastal dune development and sand drifting management along an artificial shoreline: the case of Dunkirk harbour, northern France. *Journal of Coastal Conservation* **18**, 495-504

Weisse R., Bellafiore D., Menendez M., Mendez F., Nicholls R. J., Umgiesser G. & Willems P. (2014) Changing extreme sea levels along European coasts. *Coastal engineering* **87**, (1) 4-14

## Research in progress

The Network welcomes the submission of brief progress reports on research in progress by PhD students and Academics.

Please send articles to [dunes@hope.ac.uk](mailto:dunes@hope.ac.uk)

## The Geosciences Education Project at Sandy Hook

A great example of introducing children to real world science and practical is displayed in this 20 minute video on <http://vimeo.com/59414056>. It highlights the real backyard science that can be harnessed in using local examples and bringing real scientists to inspire and enthuse young people.

The Sandy Hook sand barrier in New Jersey was used with project partners; Rutgers University Institute of Marine and Coastal sciences, The New Jersey Sea Grant Consortium, The Sandy Hook Foundation, National Park service to deliver in situ experiments and workshops to the Red Bank school middle school pupils. This included ROV technology, species Identification and beach profiling as the just some of the valuable tutorials and lessons delivered.

The Sand Dune and Shingle Network recommends and encourages any projects like this. Please watch and share.

## Horsepower experiment in the dunes

In 2013 blowouts were made in the coastal strip of the Amsterdam waterwaves Dunes, the Netherlands to get a more natural, gradual transition from sea to dunes again with new dunes on the beach and a beach ridge tops with blowouts and vital white dune vegetation.

Aftercare management however was a problem. To keep blowouts open a group of volunteers helped the site manager to remove vegetation regularly. The work in the loose sand was heavy and challenging. Waternet deliberately chooses to work as little as possible with motor vehicles in this beautiful coastal strip. Thus an experiment started in 2014 with horsepower management. Two strong Dutch horses helped Waternet by ploughing some blowouts in the dunes between Zandvoort and Noordwijk. Using an old, traditional plough on metal wheels, marram grass and dewberry were loosened. After ploughing the loosened vegetation was removed.

## Withdrawal of Timbrel

Articles in newsletter 5th March 2009 and newsletter 9th July 2010 refer to the use of the herbicide Timbrel to control Sea Buckthorn. Please note that the maker, Dow Agro Sciences, has been issued with a withdrawal notice from the Chemicals Regulation Directorate for its industrial herbicide TIMBREL. Sales through the trade were permitted to continue until 30 November 2013. The final date for disposal, storage and use of existing stocks was 30th November 2014. (see <http://uk.dowagro.com/products/timbrel/> )

This newsletter has been compiled by Tom Marshall, John Houston, Paul Rooney and Emily De Noia

Contact [dunes@hope.ac.uk](mailto:dunes@hope.ac.uk)

Website <http://coast.hope.ac.uk/>

Cover Photo: Grass of Parnassus (*Parnassia palustris*) at Cabin Hill NNR (Merseyside) ©Phil Smith

The Sand Dune and Shingle Network is based in the Department of Geography and Environmental Science, Faculty of Science, Liverpool Hope University